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EXAMINER

YIP, KENT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/606,024	Applicant(s) KLASSEN ET AL.	
	Examiner Kent Yip	Art Unit 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Response to Amendment

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 16 recite the limitation "wherein data from the virtual disk remote transfer system comprises an intermediary storage for data transfer to selected processing nodes including a RAM and a physical disk" in lines 10 and 9. It is not clear whether this "data" is referring to the "job chunks" or "a RAM and a physical disk". Dependent claims 2-15 and 17-19 are also rejected for the same reason as stated above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6, 11, 13-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christiansen et al. US 2004/0114170 (hereinafter Christiansen) in view of Cyr et al. US 5819014 (hereinafter Cyr) and Mellor et al. US 2004/0169885 (hereinafter Mellor).

Regarding Claim 1, Christiansen teaches a method of operating a printing system for parallel processing a print job with a plurality of processing nodes into a printer ready format for printing the print job (0020-0026 Fig. 1), comprising:

splitting the print job into a plurality of job chunks (0021, 0062-0064 Fig. 14), wherein the chunks range in size-from at least one page to the entire size of the print job (0021), wherein pages comprising the chunks are selected in accordance with predetermined selection factors for optimizing page printing processing efficiency (0040-0042 Fig. 8-9, 0067-0071 Fig. 15A);

selectively storing the job chunks and print-ready pages (0023 line 3, 0033 line 6-9, 0034-0035)

assigning the job chunks to respective processing nodes for parallel processing the job chunks into the printer-ready format (0022-0025, 0064 Fig. 14, 0073 Fig. 15B 633);

printing the print job (0026, 0082 Fig. 16 716).

Christiansen does not explicitly teach said processing nodes communicating with a virtual disk remote transfer system,

in the virtual disk remote transfer system wherein data from the virtual disk remote transfer system comprises an intermediary storage for data transfer to selected processing nodes including a RAM and a physical disk, and where the virtual disk remote transfer system is implemented by providing a shared memory interface;

monitoring available space in the virtual disk remote transfer system including detecting a data overflow in the RAM and storing new data in the physical disk until data storage in the RAM is available.

Cyr teaches said processing nodes communicating with a remote transfer system (col 6 lines 19-37 Fig. 6),

in the remote transfer system wherein data from the remote transfer system comprises an intermediary storage for data transfer to selected processing nodes including a physical disk, and where the remote transfer system is implemented by providing a shared memory interface (col 6 lines 19-37 Fig. 4 and 6);

remote transfer system (col 6 lines 19-37 Fig. 6).

Christiansen and Cyr are in the same field of endeavor of parallel printing using multiple RIP engines. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the printing system of Christiansen to include a method of parallel processing of print data including storing and retrieving of the data from a storage device as taught by Cyr that insures an orderly flow of information between components (col 6 lines 19-37).

Mellor teaches virtual disk (0015 Fig. 4-5),

monitoring available space in the virtual disk including detecting a data overflow in the RAM and storing new data in the physical disk until data storage in the RAM is available (0016, 0028-0029 Fig. 4, 0030 Fig. 5).

Christiansen and Mellor are in the same field of endeavor of printing. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the printing system of Christiansen to include a method of memory management that determines when to store print data in RAM and when to store print data to a hard disk as taught by Mellor that can efficiently store print data (0015-0017).

Regarding Claim 2, Christiansen in view of Cyr and Mellor teach the method defined in claim 1, further comprising the step of preventing selected chunks from being added to the virtual disk remote transfer system when the monitored available space falls below a predetermined threshold representative of the overflow (Mellor 0015-0016).

Regarding Claim 3, Christiansen in view of Cyr and Mellor teach the method defined in claim 2, wherein the splitting step is performed by a splitter (Christiansen 0021) and further comprising the step of withholding chunk destinations from the splitter (Christiansen 0076).

Regarding Claim 4, Christiansen in view of Cyr and Mellor teach the method of claim 1 further including paging out the chunks of data from the virtual disk remote transfer system in a most-recently used order, wherein a least recently-used chunk is read soonest (Mellor 0031 Fig. 6).

Regarding Claim 5, Christiansen in view of Cyr and Mellor teach the method of claim 1, wherein the predetermined factors used to determine the size of the print job further includes the total number of pages within the print job (Christiansen 0021).

Regarding Claim 6, Christiansen in view of Cyr and Mellor teach the method of claim 1, wherein the predetermined factors used to determine the size of the print job further includes the total number of bits within the print job (Christiansen 0042).

Regarding Claim 11, Christiansen in view of Cyr and Mellor teach the method of claim 1, wherein separate print queues may be defined as protected postscript and not protected postscript (Christiansen 0073).

Claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by claim language that does not limit a claim to a particular structure. Specifically, the claim language "may be defined" suggests optional functionality or utility. See MPEP §2111.04, §2143 G, §2144.04 I.

Regarding Claim 13, Christiansen in view of Cyr and Mellor teach the method of claim 1, wherein the parallel processing system incorporates load balancing to spread the workload out evenly among associated print devices (Christiansen 0021).

Regarding Claim 14, Christiansen in view of Cyr and Mellor teach the method of claim 1, wherein the parallel processing system incorporates auto discovery to evaluate the availability of hardware resources (Christiansen 0066 Fig. 15A).

Regarding Claim 15, Christiansen in view of Cyr and Mellor teach the method of claim 1, wherein the splitting functionality may have user selected status of maximum, recommended, and allocated (Christiansen Fig. 9).

Regarding Claim 16, the rationale provided above in the rejections of claim 1 and 4 are incorporated herein. Furthermore, Christiansen teaches a plurality of parallel processors (Christiansen 0022 Fig. 1).

Regarding Claim 17, Christiansen in view of Cyr and Mellor teach the method of claim 16, wherein the parallel processing comprises at least three processors connected to at least three separate memories (Christiansen 0035 Fig. 3).

Regarding Claim 20, Christiansen teaches a method of operating a printing system for parallel processing (0020-0026 Fig. 1) comprising the steps of:

- inputting a print job (Fig. 14 503);
- storing the print job in a spooling system (Fig. 14 506);
- determining the language, size and location of the print job (0021-0023, 0041-0042, 0064 Fig. 14 509);
- advising a supervisor to select splitter (0021-0022, 0067-0071 Fig. 14 519);
- splitter advised of job location and chunk parameters (0021-0023, 0064-0065 Fig. 14 519);
- assigning chunk to rasterized image processor (RIP) nodes (0022, 0073 Fig. 15b 633);
- splitting the job into chunks (0021, 0064-0065);
- selectively storing the job chunks (0023 line 3, 0033 line 6-9, 0034-0035);
- sending chunks to RIP node (0022-0025, 0064 Fig. 14, 0073 Fig. 15B 633);
- maintain chunk order by collector (0026, 0083 Fig. 16 709);

advising supervisor of chunk completion by splitter (0021, 0076-0083 Fig. 16 716);

advising collector of page to chunk association (0026, 0083 Fig. 16 709);

parallel processing of chunks by RIP nodes (0020-0026, 0035);

advising supervisor and collector that chunk processing completed (0086 Fig. 17 759);

sending rasterized chunks to memory (0024, 0079 Fig. 16 686);

completing print job by splitter (0083 Fig. 16 716); and

advising supervisor of end-of-job by collector (0026, 0083 Fig. 16 713).

Christiansen does not explicitly teach in a virtual disk remote system for intermediary storage for data transfer to selected processing nodes, said system providing a shared memory interface;

Cyr teaches teach in a remote system for intermediary storage for data transfer to selected processing nodes, said system providing a shared memory interface (col 6 lines 19-37 Fig. 4 and 6).

Mellor teaches virtual disk (0015 Fig. 4-5).

The rationales provided above in the rejection of claim 1 is applied herein.

4. Claims 7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christiansen et al. US 2004/0114170 (hereinafter Christiansen) in view of Cyr et al. US 5819014 (hereinafter Cyr), Mellor et al. US 2004/0169885 (hereinafter Mellor), and Wood et al. US 2004/0243934 (hereinafter Wood).

Regarding Claim 7, Christiansen in view of Cyr and Mellor teach the method of claim 1, however, Christiansen does not explicitly teach wherein the predetermined factors used to determine the size of the print job further includes the total amount of processing required to process the job.

Wood teaches wherein the predetermined factors used to determine the size of the print job further includes the total amount of processing required to process the job (0025-0026 Fig. 1, 0036).

Christiansen and Wood are in the same field of endeavor of parallel printing. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the exemplary criteria of Christiansen to include scheduling segments based on the complexity of the segments as taught by Wood that would have yielded a predictable result.

Regarding Claim 9, Christiansen in view of Cyr and Mellor teach the method of claim 1, however, Christiansen does not explicitly teach wherein the predetermined factors used to determine the size of the print job further includes number of pages containing non-text images contained in the print job.

Wood teaches wherein the predetermined factors used to determine the size of the print job further includes number of pages containing non-text images contained in the print job (0035).

The rationale provided above in the rejection of claim 7 is applied herein.

Regarding Claim 10, Christiansen in view of Cyr and Mellor teach the method of claim 1, however, Christiansen does not explicitly teach wherein the predetermined

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factors used to determine the size of the print job further includes number of pages containing color in the print job.

Wood teaches wherein the predetermined factors used to determine the size of the print job further includes number of pages containing color in the print job (0035).

The rationale provided above in the rejection of claim 7 is applied herein.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christiansen et al. US 2004/0114170 (hereinafter Christiansen) in view of Cyr et al. US 5819014 (hereinafter Cyr), Mellor et al. US 2004/0169885 (hereinafter Mellor), and Yamazaki US 6785727.

Regarding Claim 8, Christiansen in view of Cyr and Mellor teach the method of claim 1, however, Christiansen does not explicitly teach wherein the predetermined factors used to determine the size of the print job further includes the amount of startup time needed to set up the job.

Yamazaki teaches wherein the predetermined factors used to determine the size of the print job further includes the amount of startup time needed to set up the job (col 11 line 11 to col 12 line 11 Fig. 19 and 21).

Christiansen and Yamazaki are in the same field of endeavor of printing. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the job splitting of Christiansen to include job splitting according to smaller processing times as taught by Yamazaki that would prevent delays in print job processing (col 11 lines 48-52).

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christiansen et al. US 2004/0114170 (hereinafter Christiansen '170) in view of Cyr et al. US 5819014 (hereinafter Cyr), Mellor et al. US 2004/0169885 (hereinafter Mellor), and Christiansen US 2004/0196470 (hereinafter Christiansen '470).

Regarding Claim 12, Christiansen in view of Cyr and Mellor teach the method of claim 1, however, Christiansen '170 does not explicitly teach wherein the parallel processing system records the previous predetermined selection factors and uses statistical analysis to determine the optimal size of chunks.

Christiansen '470 teaches wherein the parallel processing system records the previous predetermined selection factors and uses statistical analysis to determine the optimal size of chunks (0030 Fig. 2 222, 0042-0044 Fig. 4, 0063-0066 Fig. 6).

Christiansen '170 and Christiansen '470 are in the same field of endeavor of parallel printing by partitioning a print job. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the partitioning criteria of Christiansen '170 to include statistical analysis as taught by Christiansen '470 to determine the optimal partition size based on predicted future workload (0025).

7. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christiansen et al. US 2004/0114170 (hereinafter Christiansen '170) in view of Cyr et al. US 5819014 (hereinafter Cyr), Mellor et al. US 2004/0169885 (hereinafter Mellor), and Cohen et al. US 6356355 (hereinafter Cohen).

Regarding Claim 18, Christiansen in view of Cyr and Mellor teach the method of claim 16, however, Christiansen does not explicitly teach wherein the parallel processing is implemented in symmetric multiprocessing wherein two or more processors can connect to a single shared main memory.

Cohen teaches wherein the parallel processing is implemented in symmetric multiprocessing wherein two or more processors can connect to a single shared main memory (col 3 lines 11-24 Fig. 2).

One of ordinary skill in the art at the time of the invention could have substituted the symmetric multiprocessing system or the distributed multiprocessor taught by Cohen for the parallel processing system comprising a plurality of processors and memories taught by Christiansen, and the results of the substitution would have been predictable. See MPEP 2143 B.

Regarding Claim 19, Christiansen in view of Cyr and Mellor teach the method of claim 16, however, Christiansen does not explicitly teach wherein the parallel processing is implemented in distributed multiprocessor.

Cohen teaches wherein the parallel processing is implemented in distributed multiprocessor (col 2 lines 38-50).

The rationale provided above in the rejection of claim 18 is applied herein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kent Yip whose telephone number is (571) 270-5244. The examiner can normally be reached on Mon - Fri 10:00 AM - 6:00 PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Twyler L. Haskins can be reached on (571) 272-7406. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. Y./
Examiner, Art Unit 2625

/Twyler L. Haskins/
Supervisory Patent Examiner, Art Unit 2625